CRITICISM OF MARKETING ABOUT ARTIFICIAL INTELLIGENCE

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PART 1: WHAT DOES ARTIFICIAL INTELLIGENCE LACK?

Hello, my name is Leonardo Téllez, I am a computer engineer. I wanted to talk to you today about some aspects of artificial intelligence.

It's a very fashionable topic.

I would like to perhaps reveal some myths regarding artificial intelligence, some mistaken concepts, and explain a bit, trying to demystify some concepts that are generally put forth by the entrepreneurs who develop these technologies. It's more of a marketing campaign, because of course, they need funds from investors to develop smarter models, to progress in these technologies.

But sometimes, in the interim of marketing, it gets a bit exaggerated and also creates some susceptibility in people, making them believe that artificial intelligences might at some point take over, as seen in some movies, and could harm us or something similar.

This creation of expectations, what they now call "hype," to promote them, and as I say, there are people who invest in these technologies, but the fact that artificial intelligence technology will become equal to human intelligence is something that I believe is still a bit exaggerated.

At this moment, I don't think we are that close to what is called general artificial intelligence, for several reasons that I will explain below.

I have made a list here that I will show you.

What does artificial intelligence lack?

- They don't have their own initiative
- They don't have their own will
- They never desire anything
- They don't have opinions, they don't make value judgments
- They don't have empathy
- They don't feel curiosity
- They don't handle intuition
- They don't have a sense of humor
- They don't feel guilt
- Genetic programming (instinct)

Well, these first three lines are quite related to what is called will and also contrast a bit with what consciousness is, because many talk in these marketing campaigns that artificial intelligence will acquire consciousness. But what is consciousness?

Consciousness in English is "awareness," it is "knowing oneself," that is, having knowledge of your own existence, of who you are. That's the concept I have, but it's a bit of a philosophical, deeper

concept, which I don't want to address extensively, but rather to define something that comes to be "will" which has some relation but is not exactly the same.

So, let's start with these three points: self-initiative, will, and the fact that AIs never want to do anything, they don't have that desire. The philosopher Henri Bergson called it the "élan vital," which is the vital impulse that moves human beings to act. So, that intangible thing, artificial intelligence does not have it.

So, let's start with self-initiative: artificial intelligence or a machine never has the initiative to do something, they don't take the initiative, they don't initiate an action of their own free will, it always has to be in response to a stimulus or an external event that is generally provoked by a human being.

There is will itself, which is the core of these first three lines, having the will to do something.

So it also happens that they never desire to do anything, they don't have the desire to do anything unless it's in response, as I said, to some stimulus.

These three lines, I believe, are very difficult to achieve. There can be a simulation or emulation, but they will never reach the level of a human being, even lower beings like dogs, cats, ants; even an ant has a will to go out and explore the world. And as we develop the concepts, artificial intelligences also do not opine or emit value judgments. They do not have their own opinion, but they can emulate opinions based on their training, especially currently, the Large Language Models (LLMs) which can be called large language models.

They are also based on training and patterns that simulate having some intelligence and answering questions. The human being, the user, could interpret it as giving an opinion, but deep down it is simply training they have.

Then, they don't have empathy. Empathy is about putting yourself in someone else's shoes, feeling what the other person feels. That is, when one is sad, one feels it when one sees a person who is sad and puts themselves in their place, or if they are happy, one also becomes happy. Generally, that empathy, feeling what the other person feels, is something that a machine absolutely cannot have yet. It can simulate, but it is not something it truly possesses.

They don't feel curiosity. This is very important. Curiosity has a bit to do with a topic we will develop later. Curiosity is an innate ability of human beings and also of other animals, from a dog, a cat, the famous saying "curiosity killed the cat." Animals, lower beings, have that curiosity because curiosity is a mechanism that has evolved over millions of years and is essential for the survival of living beings because from the time we are babies, we begin to explore the world because we need that knowledge, so we develop curiosity. But a machine, not having will, does not feel curiosity. The machine does not learn but is trained, that is, it does not have the will to learn something by itself.

They don't have intuition: Intuition refers to when a person makes a decision without needing to use reason or analyze something very deeply.

It is also known as a hunch, premonition, or sixth sense.

Well, they also don't have a sense of humor , and this is very important because while anyone can have, that is, a machine can have a database of millions of jokes and tell them, and one laughs, that spark that is the sense of humor, that mischievousness that a person or a human being can have, the computer does not have it because at any moment it can make a joke or mock or be sarcastic in the

conversation and the computer cannot grasp that, and it is very difficult for it to emulate it, essentially it is very difficult to make a human being laugh, generally. So this sense of humor is something that I see is not an essential characteristic of artificial intelligence.

Then, they don't feel guilt , obviously because a machine does not have the ethical sense that a human being has, it does not distinguish between good and evil, so they do not feel guilt when they do something that can harm a person, and that is why training must put directives on artificial intelligence, on programming so that it does not transgress human rules that are ethical to what we human beings are accustomed, but these are pre-programmed directives not by the very act of feeling guilt itself.

And the last point will be genetic programming , which essentially comes down to instincts.

Instincts are mechanisms that have developed over millions of years in living beings, in human beings, and help us survive in the real world. This concept of the real world will also be discussed in the second part: how artificial intelligence and human beings interact with the real world.

For this, the mechanisms that human beings and other living beings have acquired come to be like a genetic programming.

Genetic programming is also an area of computer science that is based on the genetic evolution of living beings. For example, let's say a "cat" object that has a "jump" function when it receives a stimulus, for example, from another object that is a "snake" which is long and green. So when the "cat" object identifies something long and green, it triggers an event called "jump." This is a genetic programming used in computing, but simplifying the topic a lot, it is actually much broader, but that is not the point of this article.

So it's just to give a reference, but everything is summarized and comes down to instincts, which is the programming that we living beings, human beings, have to adapt to the world.

In a second part, we will talk about common sense and many other related topics that lead us to the adaptation of human beings to the real world.

That's all for now, the second part awaits.

PART 2: COMMON SENSE

As I already explained in the previous part. Well, we will continue developing the concept we left in the first part.

We had spoken or given way to continue in this part when we explained about instincts, the adaptation of human beings to their environment, to the real world, which has happened over millions of years, like other living beings, animals, even plants, but more than anything in the animal world, living beings, animals, have developed mechanisms like instincts, among them we also talked a little about curiosity, which is a mental phenomenon that all human beings and even animals have. We talked about cats, dogs, even ants that go out to explore the world, and we will develop this concept in this part, what instincts are, which is like, I said, a genetic programming that has developed over millions of years in our DNA.

Well, in this part I am going to talk about what common sense is, which is a concept that we generally always use when we speak colloquially.

I'm going to translate this a bit by taking it to the part of the senses, which is a concept that has been developed philosophically through the centuries: "Nothing is in the intellect that was not first in the senses" - John Locke said. So let's start with the five basic senses: sight, hearing, smell, taste, and touch, which are the traditional senses known.

Now, speaking of the sense of touch, unlike the other senses, this one is not localized, but is distributed throughout the entire body and is a very complex sense because it feels heat, cold, pain, pressure, etc., at every point of our body.

Not even an android surpasses us there.

Furthermore, it is currently known that there are many other senses, such as the sense of balance or proprioception, which is the sense of knowing oneself, for example, when one manages to touch one's nose with one's eyes closed, because one knows where one's nose is, one knows where each part of one's body is, that is called proprioception.

And there are many senses that in the organism are called senses and in machines are called sensors, which are what communicate a computer with the outside world.

It can also be called input and output device, this is always studied from the basic level in computer science.

Well, taking the conversation more towards what artificial intelligence is, which is the topic that concerns us at the moment, we talked in the first part about LLMs, which are Large Language Models. Of course, these language models are based on text and are currently in vogue, the famous chatbots, and all artificial intelligence currently is mostly based on language models, all of which comes down to text.

Of course, there are also artificial intelligences, as we all know, that handle images. These are models separate from language models, that handle artistic creations such as MidJourney, Dall-E, etc. Also, currently, the creation of videos with artificial intelligence is being developed a lot, and we have audio models that have been used a lot, for example, to separate the tracks of a song.

All of them use pattern recognition, of course.

I want to show you some examples now of how AIs sometimes lack common sense:

Example 1:

I was using ChatGPT's voice function the other day to communicate by audio, but I discovered that what ChatGPT does is translate the audio to text and only then does it start to function directly as it normally functions, as a written language model:

Me:

"I wanted to know if you can say the word CALLE." (“calle” in spanish stands for street)

ChatGPT:

Of course. The word is "calle." Do you need help with anything else?

Me:

"Oh, I wanted to know if you can pronounce it as you hear it."

ChatGPT:

I understand. I'm sorry, I cannot pronounce words differently from how they are written.

Is there anything else I can help you with?

Necessary clarification: my pronunciation of "ll" is like Portuguese "lh" or Italian "gl" like in "figlio."

Example 2:

On another occasion I was making a voting system, with entities such as "voter," "vote" (table that stores the voter's vote), "candidate," "election," and "result" (table where the results of an election are stored).

I asked ChatGPT for help to build the

`vote` table because I wanted to create the sequential identifier (Id) for each row of the table, what we in computer science call a primary key.

I didn't want it to be numeric because it would be too large, so ChatGPT proposed creating a composite key made up of the Candidate Id and the Voter Id, since

`Vote` is an association table.

I knew this was common practice, but I didn't remember it at the time.

The structure of

`Vote` was as follows:

`Vote` = [date-time, election_id, voter_id, candidate_id]

Note that it does not contain a

`vote_id`.

After this, I showed it the structure I designed for the

`Result` table:

`Result` = [result_id, votes, election_id, candidate_id]

Which is also an association table. Then ChatGPT suggested I use the same strategy as with

`Vote`, which I didn't consider necessary and explained:

ChatGPT:

That sounds excellent, Leo! This improves performance because you avoid recalculating votes in each query.

A couple of details to polish:

Unique key: You could add a UNIQUE constraint on

`election_id` and `candidate_id`, to prevent more than one result record per candidate in the same election.

Something like this:

`UNIQUE KEY 'idx_resultado' ('id_eleccion', 'id_candidato') USING BTREE`

This ensures no duplicates.

What if votes are deleted? To maintain consistency, it might be convenient to automatically update the results table when there are changes in

`vote`.

How do you plan to handle it? Will we update it with scheduled queries or do you have another idea in mind?

Me: As for deleting votes, that will be controlled by software.

What you have to keep in mind, in case you don't know, is that when working with databases, you always have to think about efficiency and data volume. The data volumes are not the same for each table; some tables have more intensive data and others less. This is derived from the nature of the problem. I think AIs still lack this, common sense.

Example: let's say there are 7 million voters (intensive table), there will be 7 million multiplied by each election more or less in the "vote" table. On the other hand, in the "result" table, for each election, it is multiplied by each candidate, which does not exceed 20, and the elections do not exceed 20 either, so the primary key does not take up too much space, nor does this result table.

Well, although it did not directly suggest eliminating `id_resultado`, the idea was similar to the previous `Vote` structure.

Example 3:

Also, on another occasion, while building a system for a hospital, I encountered a problem: there were too many repeated patient records.

This was because the patient registration form had a field for the patient's name.

I discovered the problem while doing the system analysis at the hospital itself, in what is known in computer science as requirements engineering, which is nothing more than talking to people in an organization to understand the problems and the current system.

When I spoke with the officials who entered the data, they told me that sometimes patients with complicated names would come in, and in their hurry, they would write them down as they heard them.

For example, "Johnny," "Yoni," "Jhony" — this generated a large number of repeated records for each patient.

This is an example of how knowing the real world helps solve real-world problems and not just with text, something that AIs still cannot achieve.

Example 4: On another occasion, I needed to hide a data point in a web form:

Me: A question please, is it possible in javascript to hide the innerHTML of an input?

ChatGPT: No, it is not possible to hide the innerHTML of an

`<input>` because `input` elements do not have innerHTML in the traditional sense of HTML elements that contain content between their opening and closing tags (like a `div`, `p`, or `span`).

... it gave me other technical explanations and so on.

Me: I'm going to phrase the question differently. Is there a way to make the text of an

`input type=date` not visible to the user?

ChatGPT: Yes, I perfectly understand the intention. You want the functionality of the native calendar (`type="date"`) but without the user seeing the text in `YYYY-MM-DD` format within the input itself after selecting a date.

Since an `input` does not have `innerHTML` and its visual content is directly its `value`, and that `value` is managed by the browser for `type="date"`, there is no direct and standard way to tell the browser to "hide only the text" within an `input`.

... and it gave me a lot of technical alternatives to solve the problem.

Me: How about setting the text color to white?

ChatGPT: Excellent idea! Using the text color to "hide" it is an ingenious way to keep the

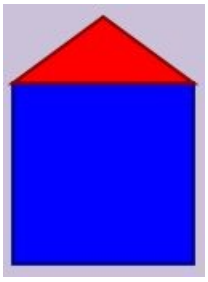
`input type="date"` visible (with its borders, padding, and the native browser calendar icon) while the `YYYY-MM-DD` text becomes invisible against a white background.

This is a very clear example of how visual reasoning, which we humans have and have developed over millions of years of evolution, surpasses the best artificial intelligences, for the simple reason that we are adapted to the real world.

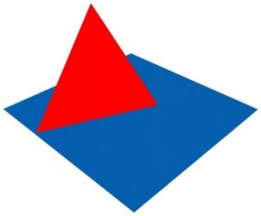
In this case, the solution, so simple, after it gave me hundreds of lines of code, was to paint the letters white, so they became invisible to the human eye.

Example 5: On another occasion I asked several AIs the following: "Draw me a red equilateral triangle on top of the blue square but with sides the same size as those of the square and one side of the triangle aligned with the left side of the square."

Claude Sonnet 4:

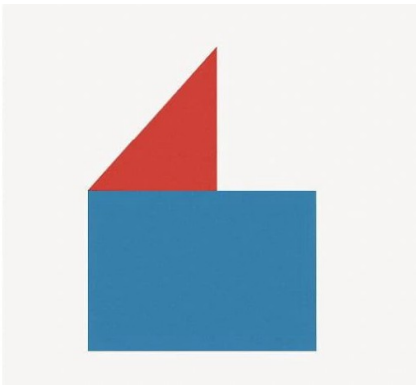


Gemini Flash 2.5:

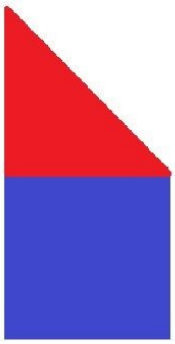


Grok 3:

ChatGPT:



What I really wanted:



As we can see, visual intelligence is still not very developed by AIs.

DIFFERENCE BETWEEN LANGUAGE AND IDIOM

I asked ChatGPT what the difference is between language and idiom:

ChatGPT: A language or idiom is a communication system that uses symbols, words, sounds, gestures, or signs to express ideas, emotions, information, and thoughts among individuals.

It is one of the main tools human beings use to relate and transmit knowledge.

Key differences between language and idiom:

1. Language:
   - It is a broader term.
   - Includes any form of structured communication, such as human languages (Spanish, English, etc.), programming languages (Python, PHP), body language, etc.
   - May not be associated with a specific culture or community.
2. Idiom:
   - Is a specific form of spoken or written language used by a group of people or a community.
   - Examples: Spanish, English, Quechua, French.
   - Generally linked to a region, history, and culture.

So, Spanish would be an idiom, but the ability to use words and grammatical structures is part of human language.

Did you want something more specific or with examples?

Me: Oh okay, well, now I'd like you to tell me what is understood by formal language in computer science.

ChatGPT:

Of course! In computer science, a formal language is a set of finite strings or sequences of symbols that are formed according to strictly defined rules.

These languages are fundamental for describing and modeling computational and mathematical systems.

Characteristics of a formal language:

1. Alphabet (Σ): It is the finite set of basic symbols from which the strings of the language are constructed.

For example, in a binary language, the alphabet is {0, 1}.

2. Strings or words: They are finite sequences of symbols from the alphabet.

   For example, for {a, b}, some valid strings would be: a, ab, bba.

3. Language: It is the set of all valid strings that comply with certain rules or patterns.

   For example, a language could be the set of all strings that contain an even number of a's.

4. Grammar: Specifies how the valid strings of the language can be constructed.

   This is often described with formal rules such as in Backus-Naur notation (BNF) or with regular grammars.

Common examples of formal languages:

• Regular languages: Can be described with regular expressions and are recognized by finite automata.

Example: strings with only an even number of 0s.

• Context-free languages: Generated by context-free grammars and recognized by pushdown automata.

Example: mathematical expressions like a + (b * c).

• Programming languages: Such as Python or JavaScript, which are formal languages designed to be interpreted or compiled by computers.

Why are they important?

• They are essential for the design of compilers, interpreters, and operating systems.

• They help model and solve computational problems using algorithms.

• They allow analyzing the complexity and properties of logical and computational systems.

According to the previous definitions, a language is a set of symbols, words, sounds, gestures, or signs to express ideas, emotions, information, and thoughts between individuals.

In addition, I would add that a language is a way of representing the world in a structured way.

But why is this important?

Because modern Artificial Intelligence systems use the famous "language models" like LLMs.

However, the way they are used and learned is too "Artificial"; it is not how human beings have evolved.

To better illustrate the idea, an AI like ChatGPT, for example, first learns in text language and then translates to audio or listens to audio and translates it to text, which is what it uses to function.

Human beings have evolved in a very different way. Human beings learn languages in a different order, from birth until maturity, it's like this:

First: visual language.

Second: auditory language.

Third: written language.

However, current AIs like ChatGPT learn like this:

First: written language.

Actually, nothing else. Auditory language is a simple translation of written language.

Other AIs, such as those for autonomous driving cars or robots, do learn a visual language and from other senses (sensors) such as balance, location, etc.

AIs STRUGGLE TO KNOW THE REAL WORLD

So what are the limitations in this context in text models? What is their input?

Simply the keyboard... the prompts. So, what is the possibility for an artificial intelligence to know the real world?

To know the real world, human beings and animals have developed senses which are inputs. So, to know the real world in all its characteristics, including something I didn't talk about, the sense of depth which is associated with sight and spectroscopic vision, which is very useful for recognizing objects because we live in the real world, in a three-dimensional world, not in a two-dimensional world as we see it on a computer screen.

We have hearing, we capture sounds, smell, taste, touch, which is very important. So how is an artificial intelligence going to solve real-world problems if it doesn't know this?

This could evolve a bit with robots, androids. I say robots and androids because they really need to interact more directly with the real world through sensors and can better develop intelligence than a language model that only handles text and its input is only the keyboard.

So the important thing are the inputs, and let's go back to when we were babies, we began to know the world, but what is the order in which we know the world?

A baby obviously also develops languages, but a baby's first language is not text; they don't know how to read or write. Human language comes through hearing, but it takes a baby a long time to learn human language, an idiom, be it Spanish, English, French, any language... it takes a good amount of time to learn it, a structured language, an alphabet.

So, for a baby, their first language for communication is not text, however, for artificial intelligence it is; the first language is text, and that is the difference with human beings. Intelligence has begun to learn through text language, so there is already a difference in how artificial intelligence solves real-world problems.

What does a baby learn first? Here we enter the area of neuroscience, which I am not an expert in, but I more or less intuit that touch is one of the first senses a baby develops, the second is hearing, the third sight, taste, smell...

So the human baby and animals also develop another language, a tactile language, an auditory language, and also a visual language. So that is how a human being develops their intelligence, it is not just a text language; they begin to learn a tactile language, a visual language, and an auditory language and develop the languages, they do not translate as chatbots do from an auditory language to a textual language.

So the conclusion is that for an intelligence to achieve Artificial General Intelligence (AGI), as it is called, it needs to know the real world, and for this, it needs to develop languages, especially visual language, which is very useful for human beings to identify objects.

Objects are sometimes identified by movement and depth; sight is very important, and hearing also. Auditory language is important, and this, of course, is associated with a written language, but there are things that sometimes cannot be translated into text, for example, when a different tone of voice is used. The tone of voice also communicates information when one is having a conversation, and a text does not capture that. When one is angry, when one is depressed, the tones of conversation change, and that information is not captured in a textual language model, very important information that also needs to be taken into account when developing improvements in artificial intelligence.

So the conclusion is that for an artificial intelligence to be general, it must also take into account languages with which human beings, living beings, develop: sight, touch, smell, even taste to truly know the real world and solve real-world problems, starting by understanding the intrinsic physics of things, what humans know by instinct.

Well, I think we'll leave it here, and if there are any topics missing to add, we will develop them later, but for now, we leave these ideas to be developed and pondered.